

Performance Contracting for Substance Abuse Treatment

Margaret Commons, Thomas G. McGuire, and Michael H. Riordan

Objective. To describe an innovation in performance contracting for substance abuse services in the State of Maine and examine data on measured performance by providers before and after the innovation.

Data Sources and Collection. From the Maine Addiction Treatment System (MATS), an admission and discharge data set collected by the Maine Office of Substance Abuse (OSA). The MATS data for this study include information on clients of programs receiving public funding from October 1, 1989 through June 30, 1994. Additional data are drawn from the contracts between the state and providers, and from service delivery reports submitted to OSA.

Study Design. Client-level performance measures were calculated directly from MATS using OSA's formulas and standards, and then aggregated to the treatment program level. Multivariate regression analysis was done for each performance indicator as a dependent variable with performance contracting, time, extent of state funding, and provider characteristics as independent variables.

Principal Findings. Performance contracting is positively related to better performance for effectiveness indicators overall. Individual effectiveness indicators that showed improvement include drug use indicators (abstinence and reduction in use) and social functioning indicators. In addition, performance contracting is associated with an increase in efficiency performance, defined as delivery of the contracted amount of service, for agencies that depend heavily on OSA for funding. Finally, performance contracting appears unrelated to the special populations indicators that measure services to target populations that OSA considers harder to treat.

Conclusions. There is tentative evidence of a relationship between provider performance and the introduction of performance contracting. More definite conclusions await more detailed analyses of client-level data.

Key Words. Performance contracting, outcome monitoring, substance abuse treatment

Interest is widespread in making more cost effective government's provision of social services, including substance abuse treatment services. Ideally, the government agencies providing the funding care about the outcomes of

treatment services, for example, a reduction in substance use or improvement in employment for a substance abuser. As Smith and Lipsky (1992) point out, however, a government agency in practice purchases the "discretionary judgments and actions" of clinicians who select and treat individuals. The agency has difficulty knowing whether the clinician's "judgment was sound" when choosing how and to whom to deliver the services. In response to this kind of problem, agencies are experimenting with new ways to provide incentives and monitor outcomes, including privatization, more competition, and performance contracting.¹ Performance contracts are designed to give private providers better financial incentives to provide care to high-priority state clients in a cost-effective manner. In general, continuation of funding or the level of funding is tied to specific treatment processes and/or outcomes.

The Institute of Medicine (IOM) called performance contracting one of "the keys to upgrading drug treatment and introducing it permanently into the mainstreams of health and human services" (Institute of Medicine 1990:221). At this point, this claim is not based on research evidence. This article examines the ongoing experience with performance contracting in Maine. In 1992, the Maine Office of Substance Abuse (OSA) instituted a performance-based contracting (PBC) system to finance all publicly supported substance abuse treatment services in the state. Rather than merely requiring the delivery of a specified number of services, OSA now requires specific aggregate treatment outcomes. Treatment should "produce" reduction in substance use, improvement in employment status, reduction in arrests, and other desired outcomes. It is no longer sufficient simply to deliver the contracted units of treatment services; rather, the units delivered should improve the clients' condition.

We begin with a discussion of the Maine Office of Substance Abuse, the contracting system, and the data collected as part of the contracting system. The next section presents quarterly statistics on provider performance, both before and during the performance contracting period. Finally, we present regression results relating the introduction of performance contracting to provider performance while controlling for program characteristics. The

Research support has been provided by Grants 1 R01-DA08715-01 from the National Institute on Drug Abuse and K05-MH01263 from the National Institute of Mental Health.

Address correspondence and requests for reprints to Thomas G. McGuire, Ph.D., Professor, Department of Economics, Boston University, 270 Bay State Road, Boston, MA, 02215. Margaret Commons, M.A., M.P.H. is a research consultant and project manager at Boston University; and Michael H. Riordan, Ph.D. is a professor of economics at Boston University. This article, submitted to *Health Services Research* on July 8, 1996 was revised and accepted for publication on January 16, 1997.

purpose of the regression analysis is to separate a “PBC effect” from other factors influencing performance that were also changing around the time of the contracting change. In the regressions, we look for a discontinuous change in performance at the time of the introduction of PBC over and above any time trend. Further, we expect PBC to have more effect on the performance of agencies that depend on OSA more heavily for funding, and our regression analysis is designed to check for this as well. Our finding is that PBC seems to have had a measurable positive effect on some dimensions of provider performance. We conclude with a discussion of our ongoing research and other possible research directions.

SETTING AND DATA

The Maine Office of Substance Abuse

The Maine Substance Abuse Prevention and Treatment Act, which took effect July 14, 1990, created the Office of Substance Abuse as a branch of the State’s Executive Department. The act made a single administrative unit, OSA, accountable directly to the governor and gave OSA responsibility for planning, developing, implementing, and coordinating all of the state’s substance abuse activities and services. To this end, OSA was authorized to develop uniform contracting formats, to contract for community services, to establish operating and treatment standards, and to certify compliance. OSA does not directly provide substance abuse treatment services. Rather it licenses, certifies, and contracts with private agencies, who provide services. OSA supports a full range of treatment services: detoxification, residential rehabilitation, halfway house, extended shelter, extended care, emergency shelter, and outpatient counseling.

OSA receives an appropriation from the legislature that it allocates to different programs. Individual programs (or agencies with multiple programs) are notified of their allocations and requested to complete a standard contract, including detailed budget information for both the total program and the services contracted to OSA. The OSA allocation divided by total program expense determines the percentage of total program service units purchased by OSA. The implied unit cost for services purchased by OSA is determined by dividing the OSA allocation by the number of contracted service units. OSA, therefore, is purchasing a percentage of the total program and not services to specific individuals.

Previously, OSA's allocations to providers were based generally on the amount of funding the program received in previous years, with decreases or increases in the state and federal appropriations spread more or less evenly across all providers. Contract compliance was loosely monitored; compliance was more often considered to be timely submission of reports than provision of the contracted units of service. Treatment outcomes were not monitored until standardized admission and discharge data collection was introduced in October 1989. On July 1, 1992 OSA introduced specific performance measures and standards into its contracts with treatment providers.² Maine's contracts continue to require detailed income and expenditure budgets that are used to determine the level of contracted services and payments. Now, however, the contracts specifically provide that the "allocation of resources for the contract year may be affected by agency performance in the previous year".³ In addition, the Maine system attempts to dampen the incentive to avoid treating difficult clients by requiring minimum levels of services to specified target populations.

The Maine Addiction Treatment System. The majority of the data used to measure a program's performance is from OSA's standardized admission and discharge data, the Maine Addiction Treatment System (MATS). This system has been in operation since October 1989.⁴ When the client is admitted (or readmitted) into a program, the client information is recorded on an admission form, along with certain program-specific information.⁵ The information collected includes demographic variables (age, race, sex, education, living situation), income and employment variables, criminal involvement variables, and certain health variables (pregnancy, recent medical treatment, IV drug use). The client's substance abuse is assessed: type of drug, frequency, route of administration, and age of first use for primary, secondary, and tertiary substances. Social functioning variables include problems with family members, employers, or school, as well as absenteeism caused by substance use. Service delivery information is available for each modality that a program offers and includes the number of units and unit cost.

When the client leaves a particular program (whether or not treatment is completed), the agency completes a discharge form that records current information on many of the admission variables and also includes information on the number and type of services the client received, termination status (no-show, arrest, death), expected payment sources, and referral information. If a client fails to complete treatment, the discharge form is completed based on the last treatment contact with the client as recorded in the clinical records. Each treatment episode notes the specific modality and agency. Information

is collected for each treatment episode within an agency, even if the client is referred from or to a program within the same agency. (See Commons, McGuire, and Riordan [1993] for more information on the MATS data collection system.)

To a large extent, information on a client is based on the reports of the client him or herself. While the validity of client self-report has been questioned (see Aiken 1986; Magura, Goldsmith, Casriel, et al. 1987; and Maisto, McKay, and Connors 1990), it is costly, intrusive, and potentially disruptive to treatment to test for substance use independently (e.g., through urinalysis). Therefore, outcome monitoring for other than purely research purposes depends, in general, on client self-report. The data used in our analysis originates as client self-report but is first passed through treatment program personnel before being submitted to OSA. Therefore, our calculations of provider performance are based on information from the client as interpreted, or at least recorded, by either a clinician or administrative staff based on clinicians' records. At this stage in our research, we have not attempted to control for any possible changes in provider reporting practices that may have been associated with the introduction of PBC.

Maine's Performance-Based Contracting System

Under Maine's new contracting system, program performance is grouped into three categories, defined by OSA as efficiency, effectiveness, and special populations. A program "meets standards" overall if it meets minimum levels of performance on a specified number of indicators within each of these categories. Performance on each indicator is the percentage of clients experiencing "good" outcomes. The contract includes separate performance standards for each type of service provided. Different modalities, while often sharing common indicators, have different minimum standards associated with the indicators and different numbers of indicators that must be met.

Efficiency standards measure service utilization. In order to meet the efficiency standards, programs are required to deliver a modality-specific percentage of contracted units. Outpatient standards also specify how units of service are to be broken down into services to primary clients and to codependents/affected others; at least 70 percent of all services delivered must go to primary clients. Efficiency is therefore measuring to what extent the program has delivered the services promised to the state.

Effectiveness standards measure treatment outcomes. Effectiveness is measured at the time of a client's discharge from a program and is either a measure of the change in client status between the time of admission and the

time of discharge (e.g., reduction in use) or a measure of the occurrence of an event (e.g., no arrest during treatment). The substance use measures include both abstinence 30 days prior to discharge and reduction in use between admission and discharge. Social role functioning outcome measures include employment (maintenance, improvement, absenteeism, and problems with employer), criminal involvement (no "operating under the influence" [OUI] or other arrest during treatment), and relationships (problems with spouse and with family). In addition, OSA's effectiveness measures include such process measures as referral in the continuum of care, time in treatment, and participation in self-help.

Special population standards measure service delivery to target populations, including women, adolescents, the elderly, and poly-drug and IV drug users. Program performance in this area is based on admissions during the period under examination. The target populations are those that OSA deems more difficult to treat and those undertreated in the population.

The contract specifies a minimum standard for each outcome indicator: for effectiveness the standard is stated as a minimum percentage of clients who should experience the particular outcome, while for special populations it is a minimum percentage of clients who should be members of the target population. The contract requires that program performance remain at or above the minimum level for a specified number of the total indicators. Table 1 contains the 1993 performance measures and standards for outpatient counseling, residential rehabilitation, and detoxification.

OSA's Use of Performance Measures. OSA staff monitor the performance measures quarterly, reviewing the performance data and identifying programs failing to meet the standards in any of the three areas. These low performers are requested to submit a corrective action plan to OSA that identifies the cause(s) of the insufficient performance and the steps to be taken to meet the minimal standards. Corrective action plans may include increased outreach, additional attention to admission and discharge interviews, reexamination of existing treatment policies to increase staff-client contact, or similar activities.

The fiscal year (FY) 1994 contract allocations were the first to be officially subject to review based on performance data. In preparation for FY 1994 contracting decisions, OSA contracting staff met with licensing and program evaluation staff to review six months of FY 1993 performance data; no FY 1992 data could be considered due to a hold harmless provision in contracts for that year. Each program that did not meet the performance

Table 1: Performance Measures and Standards: 1993 Maine Performance Contracting System

	<i>Outpatient</i>	<i>Residential Rehabilitation</i>	<i>Detoxification</i>
<i>Efficiency Standards</i>			
Minimum service delivery (percent of contracted amount)	90.0%*	80.0%	70.0%
Minimum service delivery to primary clients (percent of total units delivered)	70.0%	na [†]	na
Number to be met [‡]	2 of 2	1 of 1	1 of 1
<i>Effectiveness Standards</i>			
Abstinence/drug free 30 days prior to termination	70.0%	85.0%	na
Reduction of use of primary substance abuse problem	60.0%	85.0%	na
Maintaining employment	90.0%	90.0%	na
Employment improvement	30.0%	5.0%	na
Employability	3.0%	3.0%	na
Reduction in number of problems with employer	70.0%	na	na
Reduction in absenteeism	50.0%	na	na
Not arrested for OUI offense during treatment	70.0%	na	na
Not arrested for any offense	95.0%	na	na
Participation in self-help during treatment	40.0%	80.0%	na
Reduction of problems with spouse/significant other	65.0%	60.0%	na
Reduction of problems with other family members	65.0%	60.0%	na
Referral in continuum of care	na	90.0%	45.0%
Referral to self-help	na	na	20.0%
Time in treatment	na	na	4 days
Number to be met	8 of 12	5 of 9	2 of 3
<i>Special Populations Standards</i>			
Females	30.0%	40.0%	14.0%
Age: 0–19	10.0%	4.0%	1.0%
Age: 50+	6.0%	5.0%	12.0%
Corrections	25.0%	10.0%	2.0%
Homeless	1.0%	1.0%	20.0%
Concurrent psychological problems	8.0%	3.0%	11.0%
History of IV drug use	12.0%	15.0%	27.0%
Poly-drug use	35.0%	40.0%	28.0%
Number to be met	5 of 8	5 of 8	5 of 8

*Percentages are the minimum percent of total clients that must meet the indicator for the program to be deemed to have met that indicator.

[†]Not applicable. Programs offering the treatment modality are not required to meet the indicator.

[‡]Number to be met is the number of indicators the program must meet to be deemed to have performed in that category. For example, outpatient programs must meet both efficiency indicators but only 8 of the 12 effectiveness indicators.

criteria was asked to meet with OSA staff to review the performance data and to discuss possible actions to improve performance.

The intent of these reviews was to assist programs in improving their performance, and few cuts in funding allocation for the FY 1994 contract year were made on the basis of performance scores. OSA chose to contract with certain low-efficiency performers on a fee-for-service basis instead of decreasing funding to or terminating contracts with these agencies. OSA imposed special conditions on providers with low effectiveness or special population performance. For example, a program that performed inadequately on the "Age 0-19" special population indicator might have had conditions added to its new contract requiring specific outreach activities aimed at this population. Finally, in the case of some low overall performers, OSA renewed the program's contract only for a period of six months.

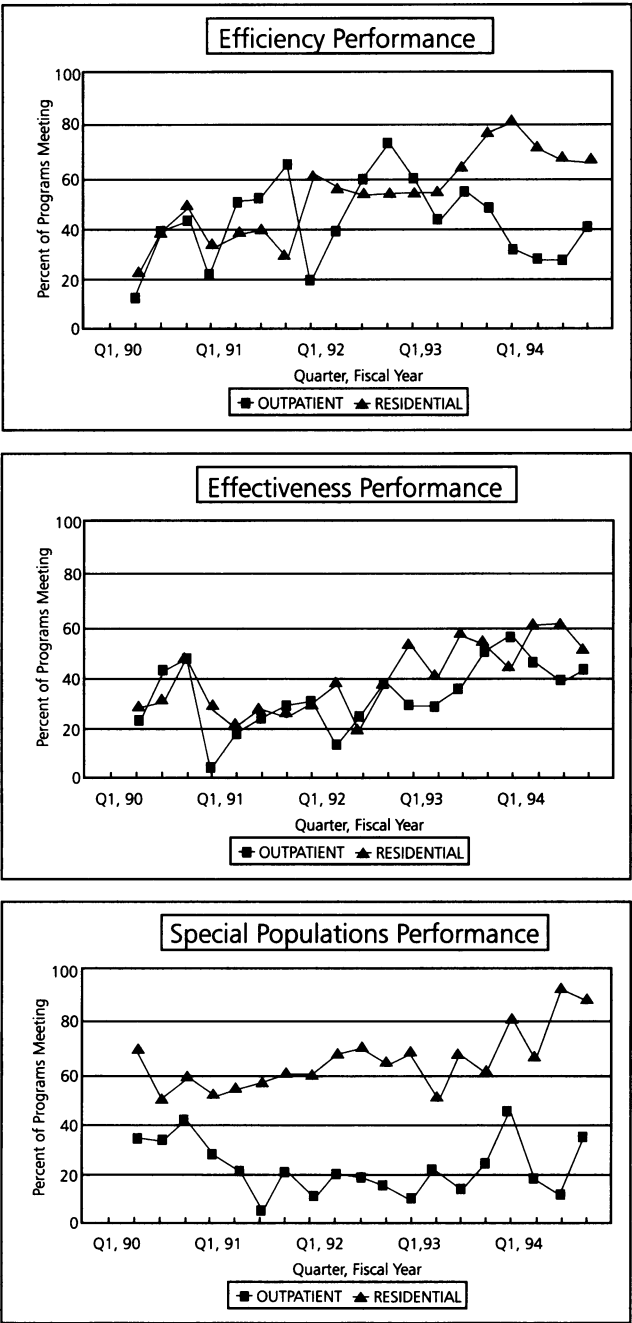
Providers have been rewarded for good performance. Additional federal block grant funds were awarded to certain providers to provide specialized group counseling services. In addition, performance data allowed OSA to target specific agencies it wanted to encourage to expand their scope and enhance their continuum of services. For example, certain agencies offering shelter or residential treatment services received additional funds and technical assistance to develop outpatient treatment services.

TRENDS IN PERFORMANCE

This section presents data on the quarterly performance of contracted programs⁶ during the period FY 1990 through FY 1994. Data for all three performance categories are presented in Figure 1, where programs are divided into outpatient and residential.⁷ In this article, we use OSA's formulas and terminology when discussing performance in the effectiveness and special populations categories. However, in order to make comparison across time more consistent, we have chosen to depart from OSA in the efficiency category using only the minimum service delivery indicator as the measure of efficiency for both outpatient and residential programs. The data for the second outpatient indicator are not available for nearly one-third of our study period (OSA did not require this data until FY 1992) and is not applicable to residential programs.

Performance is measured using OSA's FY 1993 standards for all fiscal years with some exceptions.⁸ Efficiency performance data come from service delivery reports that the providers submit separately to OSA. Effectiveness and special populations performance data are calculated from the client admission and discharge data and are therefore calculated only from the second

Figure 1: Trends in Performance



quarter of FY 1990, as MATS was not implemented until October 1989. We therefore begin our data analyses with the second quarter of FY 1990.

Efficiency performance of both outpatient and residential programs improved over the course of the study period with residential programs exhibiting the largest increase. Only 24 percent of the residential programs performed according to the efficiency standard at the beginning of the study period, whereas 67 percent met the efficiency requirement during the last quarter of FY 1994. Approximately 14 percent of outpatient programs met the efficiency standard in the second quarter of FY 1990, compared to 40 percent at the end of FY 1994. There is considerable change in the percentage of programs meeting the standard each quarter with both increases and decreases in the percentage between quarters, especially for outpatient programs. In no quarter do we find the percentage of programs falling below that of the initial quarter. For residential programs, no quarter is as high as the final quarter, but for outpatient programs, more than one-half of the previous quarters are higher than the final quarter. We find a clearer increasing trend in the efficiency performance of residential programs than of outpatient programs.

Effectiveness performance of both residential and outpatient programs shows an upward trend over the study period but again shows much movement between quarters. Data to measure performance in the following indicators were not collected until April 1990: reduction in problems with spouse/significant other, reduction in problems with other family members, reduction in problems with employer/school, and reduction in absenteeism. The addition of these four indicators appears to have had a large effect on the outpatient programs' measured performance: the percentage of programs that met the required number of standards dropped from roughly 50 percent to close to 5 percent at the beginning of FY 1991. The percentage drops between five other quarters but never by such a large amount. By the end of FY 1994, however, outpatient performance increased to over 45 percent of programs meeting. While this is an increase of 15 percentage points from the first quarter of our data, it is the same as the second quarter and is a lower percentage than that of four other quarters. Effectiveness performance of the residential programs rose and fell throughout the period, but increased overall from over 30 percent of programs meeting effectiveness standards to over 50 percent; however, in five other quarters, the percentage of residential programs meeting is higher. Once again, although the percentage of programs meeting at the end points of our data period indicate improvement,

we cannot find clear evidence of a consistent upward trend in effectiveness performance.

A wide gap in special populations' performance appears between outpatient and residential programs. Outpatient performance was virtually the same at the initial and final quarters of the data: 33 percent of programs in FY 1990, Quarter 2, and 34 percent of programs in FY 1994, Quarter 4, met special populations standards. However, for approximately two years in the middle of our study period, the percentage of outpatient programs that met special populations standards was at or below 20 percent. Residential programs, on the other hand, trended slowly upward throughout our study, beginning with nearly 60 percent of the programs meeting the special populations requirements and ending with 91 percent meeting them in the fourth quarter of FY 1994. Even here, however, for the final two fiscal years, the percentage of programs meeting the requirements seesaws, rising then falling between successive quarters.

Table 2 presents the statistical significance of the difference in pre- and post-performance contracting means for each indicator and category score. For effectiveness and special populations, we calculate the category score as the fraction of indicators met out of the total possible indicators in a category. For example, if an outpatient program was measured on 12 effectiveness indicators and met the requirements of 6, its effectiveness score would be 0.5. For efficiency we continue to examine only one indicator—minimum service delivery—as explained above. We find that the mean for the efficiency indicator was higher before the introduction of performance contracting. On average, prior to the introduction of PBC programs delivered more services than contractually required, while after PBC began, programs delivered almost exactly the contracted amount. We do find a statistically significant difference in the means of the overall effectiveness score. Prior to the introduction of performance contracting, programs met, on average, half of the applicable effectiveness indicators. After the change in contracting system, the average is .59. Looking at the individual effectiveness indicators, we find that both substance use indicators showed significant increases after performance contracting. The three employment indicators also showed improvement. The pre/post means for indicators measuring criminal involvement and family functioning, however, are either insignificant or decrease slightly after performance contracting was instituted. We also note that time in treatment rose from an average of 48 to 61 days. Finally, the means for the special populations score are different at the .06 significance level, but

the difference is slight, rising only from .53 to .55. Only three of the nine indicators have pre/post means that are statistically different; of the three, two increased (concurrent psychological problem and poly-drug use) and one decreased slightly (IV drug use).

Table 2: Difference in Means Pre- and Post-PBC

<i>Indicator</i>	<i>Variable</i>	<i>Pre-PBC Mean</i>	<i>Post-PBC Mean</i>	<i>Significance Prob > F</i>
<i>Efficiency</i>				
Minimum service delivery (percent of contracted amount)	pctkdel	1.1533	0.9952	0.0021
<i>Effectiveness</i>				
Abstinence	abmet	0.7268	0.7893	0.0000
Reduction in use	rdmet	0.6731	0.7500	0.0000
Maintained employment	mntmet	0.9009	0.9274	0.0017
Employment improvement	impmet	0.2258	0.2680	0.0111
Employability	embmet	0.0215	0.0611	0.0000
Reduction problems with job	pjbmet	0.5566	0.4254	0.0000
Reduction in absenteeism	wrkmet	0.5953	0.7621	0.0000
No arrests	armet	0.9587	0.9536	0.1523
No OUI arrests	ouimet	0.9862	0.9867	0.7693
Participation in self-help	shmet	0.5517	0.5640	0.4354
Reduction problems with spouse	psomet	0.6530	0.6621	0.8068
Reduction problems with family	pfmnet	0.5532	0.4925	0.0155
Referral	refmet	0.2332	0.3305	0.0000
Recommend self-help	rcmmet	0.8705	0.9196	0.0000
Time in treatment	timmet	48.3417	60.6649	0.0019
Effectiveness score	effscor	0.4908	0.5918	0.0000
<i>Special Populations</i>				
Females	femmet	0.1798	0.1834	0.7109
Age: 0-19	a19met	0.0659	0.0710	0.5431
Age: 50+	a50met	0.1301	0.1236	0.1836
Corrections	cormet	0.1891	0.2088	0.2065
Homeless	hlsmet	0.3054	0.3106	0.7872
Concurrent psychological problem	psymet	0.1138	0.1517	0.0000
IV drug use	ivmet	0.0954	0.0750	0.0000
Poly-drug use	plymet	0.3422	0.4176	0.0000
DHS referral	dhsmet	0.0404	0.0423	0.7181
Special populations score	spopscor	0.5313	0.5512	0.0674

Notes: Observations weighted by number of clients measured in each period.

Means do not include noncontracted programs.

REGRESSION ANALYSIS

METHOD AND VARIABLES

We undertook regression analysis on quarterly data for each performance indicator in order to test whether there has been an increase in performance, as measured by OSA, associated with the introduction of performance-based contracting. We estimate all regressions using weighted least squares in STATA, the weights being the number of clients measured as a basis for performance for that indicator at that program.⁹ A program contributes one observation for each quarter of performance data available. About 10 percent of our program-quarter observations are for programs that did not have an OSA contract throughout the study period.¹⁰ We control for covariates that might affect performance and allow for a time trend and a quarterly seasonality effect. We interact PBC with the share of OSA in program funding to test if the effect of PBC is stronger on programs relying more on funds from OSA.

Dependent Variables. Our dependent variables are the various measures of performance used by OSA. The main regressions use overall scores for the effectiveness and special population dimensions of performance, but we use only the minimum service delivery indicator for efficiency as previously explained. In addition, we estimate regressions for each performance measure. Performance is measured as the percentage of clients who met the performance criteria for each program for each quarter. For example, in the case of the effectiveness indicator "Abstinence," the dependent variable is the percentage of clients abstinent at discharge from a program for a quarter.

Independent Variables. We include both time, t , and an indicator of whether performance-based contracting was in effect, pbc . The t variable is a simple measure of time in quarters, while pbc separates time into pre- and post-PBC quarters. This allows us to separate a possible improvement over time from a change in performance more directly related to the introduction of performance-based contracting in FY 1993. For example, it is possible that changes occurred in the severity of drug abuse in the general population or that substance abuse treatment practices improved due to advances in the general knowledge of the problem. These events are independent of the introduction of performance contracting and are captured in t . Also, as MATS was introduced prior to performance contracting, it is possible that program behavior changed gradually with the knowledge that OSA was better able to monitor program results. This shift in behavior would also be captured in t .

It is possible, of course, that the effect of time is nonlinear and that for reasons unrelated to the introduction of PBC, performance changed coincidentally. We address this with an additional indicator of the impact of PBC. *Osashare* measures the amount of the program purchased by OSA and is the annual allocation divided by the total program cost.¹¹ The degree to which a program's operation, and potentially existence, is dependent on funds from OSA should be related to the attention paid to performance-based contracting and to the effort made to perform well on outcomes deemed important by OSA. We include both *osashare* and an interaction term, the product of *osashare* (here measured as a deviation from the mean value) and *pbc* to measure this effect. We hypothesize that the coefficient on *osapbc* will be positive, indicating that programs dependent on OSA are more sensitive to the incentives in PBC.

We also include variables that measure program characteristics. *Multimod* is a 0/1 variable that measures whether a program is part of a larger treatment agency offering additional programs. This could be either a totally different service (outpatient and residential rehabilitation) or two separate but same-modality services (both regular and rural outpatient counseling programs). Many researchers have examined the question of whether matching clients to specific treatment modalities produces better client outcomes (McLellan and Alterman 1991). We hypothesize that clients are more likely to be referred to a more appropriate treatment service if that service is in-house. This could be due to the fact that clients are "matched" at intake, that clinicians are more aware of in-house services, or that in-house referral does not affect the provider agency financially, as would a referral to a different agency.

For *urbrural* a score of 0 (rural), 1 (population between 5,000 and 10,000), or 2 (population above 10,000) is assigned to each of the program sites listed in the contract, and the average for the year is computed. It is sometimes argued that providing services in rural areas is both more difficult and more expensive. By averaging the rural/urban score of each of a program's sites, this variable is a proxy for the extent of the program's rural/urban focus and tests whether this focus affects performance as measured by OSA.

Total admissions in the quarter, *totadm*, is used as a proxy for the size of a program.¹² The size of a program may increase the potential for better performance as management may be able to shift resources to services that boost performance. On the other hand, size may be an indication of a more rigid bureaucracy that may hinder the innovation that might improve performance.

The annual average cost per admission, *admcost*, is computed using the total program expense (not just OSA's allocation) and the total annual admissions.¹³ A dummy variable for a noncontracted program, *nonk*, controls for unobserved differences between these programs and contracted programs. It is possible that there is a trade-off between cost of treatment and outcomes. Treatment that leads to better outcomes may require more intensity, better-qualified clinicians, or other more costly processes.

We would anticipate that clients whose lives are more severely affected by substance abuse are more difficult to treat and therefore have lower overall outcomes from a particular treatment episode. We measure the average severity of the program's clients with the variable *avgsev*, which is measured at admission. Clients are assessed by the clinician at admission and may be scored (1) casual/experimental user, (2) lifestyle-involved user, (3) lifestyle-dependent user, or (4) dysfunctional user.

Our analysis of the trends in performance showed considerable variation between quarters that may be the result of seasonality. In order to control for this possible effect, we include three dummy variables identifying observations in the second, third, and fourth fiscal quarters.

Finally, we include a variable that identifies residential programs. *Modgrp* is equal to 1 if the program is a residential program.

RESULTS

Table 3 contains the estimates of the key coefficients for evaluating the impact of PBC on the measure of efficiency and the overall measures of effectiveness and serving special populations. All three dependent variables are measured on a scale of zero to one. In the case of efficiency, the measure is the share of contracted services delivered. For the effectiveness and special population measures of performance, the value of the variable is the share of indicators met. (For example, if 8 of 12 indicators were met, the value would be .667.) Actual regressions included the set of covariates discussed above.¹⁴

The time trend for efficiency is positive and significant, indicating that efficiency is increasing on average about 2.2 percent per quarter in these data. The PBC effect is measured by two variables, the dummy variable *pbc* and the interaction between this variable and the share of program costs paid by OSA after subtracting out the mean of the OSA shares, *osapbc*. These variables must be interpreted together. The estimated coefficient on *pbc* is $-.269$. This is literally the estimate of the PBC effect for programs that have the mean

Table 3:: Summary of Regression Results for Overall Performance

	Efficiency	Effectiveness	Special Populations
Time effect: <i>t</i>	.022**	.008**	.004*
PBC effect: <i>pbc</i>	-.269**	.057*	-.020
Interaction: <i>osapbc</i> [†]	1.35**	.374**	-.006
<i>N</i>	827.	877.	892.
<i>R</i> ²	.372	.270	.202

*significant at the .05 level; **significant at the .01 level.

[†]Other covariates include: *multimod*, *urbrural*, *nonk*, *admcost*, *osashare*, *avgsev*, *totadm*, *modgrp*, *qtr2*, *qtr3*, and *qtr4*.

share of their costs paid for by OSA. The mean value of *osashare* is about .49. For a program with *osashare* 20 percent above this amount (i.e., about 70 percent), the impact of PBC is $-.269 + .2(1.35)$ or about 0.1 percent. Thus while the average program had a decrease in efficiency associated with PBC (and the decrease was greatest for programs with little dependence on OSA for funding), a program with roughly 70 percent of its funding from OSA's allocation had a slight increase. Further, a program completely dependent on OSA for funding had a 40 percent increase in efficiency associated with PBC $[-.269 + .5(1.35)]$.

The time trend for effectiveness is also positive and significant, implying a 0.8 percent improvement in measured effectiveness each quarter. Both the PBC effect and the interaction term are positive. The average program improves 5.7 percent. A program with an OSA share that is 20 percent above the mean has an estimated improvement in effectiveness of $.057 + .2(.374) = 13$ percent. Programs where OSA is less dominant improve less or do not improve at all.

There is no significant effect of PBC on the population-related measures of performance. There is a small positive and significant time trend.

We believe the most convincing results in Table 3 are the positive and significant coefficients estimated for the interaction terms in the efficiency and effectiveness equations. The PBC effect variable itself could be simply a measure of a nonlinearity in the time trend. We have no way to rebut this with data from a single state. More convincing to us is that the effect of PBC is higher where theory would suggest it should be higher (e.g., in programs in which OSA's regulatory sanctions are potentially more powerful). Time trends cannot account for this effect.

In addition to these overall regressions, we also conducted regressions for each performance measure individually.¹⁵ The same set of covariates

was used for each equation. The PBC effect (for programs at the mean value of *osashare*) is positive and significant for nine effectiveness indicators (abstinence, reduction in use, reduction in problems with job, no arrests, no OUI arrests, participation in self-help, reduction in problems with spouse, reduction in problems with family, and referrals), positive but not significant for three others (maintained employment, employment improvement, and employability), and negative but not significant for three (reduction in absenteeism, recommended self-help, and time in treatment). This pattern of coefficients suggests that the overall PBC effect on effectiveness is positive. No clear pattern emerged with respect to the interaction term *osapbc* when regressions were run on each effectiveness indicator singly. There was also no pattern of effect of *pbc* or *osapbc* for the individual special population indicators.

We tested the specification of our regressions in several ways. We dropped the dummy variable for the noncontracted programs, and dropped the cost per admission variable. We also considered a squared term for the interaction in addition to the interaction term itself. These changes did not materially alter the character of the results.

DISCUSSION

Our results indicate that the introduction of performance contracting by the Maine Office of Substance Abuse is correlated with changes in measured performance. As reported above, we find evidence that effectiveness, as defined by the state, has improved since the new contracting system was put in place. Efficiency may also have improved overall, although initially it declined. Most importantly, improvements in both effectiveness and efficiency, relative to a time trend, are positively correlated with the extent to which an agency relies on OSA for funding, controlling for other agency characteristics. Finally, the special populations performance requirements of the contracting system do not appear to have had an effect.

A major limitation of our research is that it relies on performance as reported by the agency. It is possible that some or all of the effects of PBC are due to changes in reporting practices. In further research, we are attempting to separate the “real” from the “reported” impact. Measurement of certain outcomes, particularly social role functioning outcomes, has an added dimension of difficulty in that the level of detail concerning “functioning” and the amount of time needed to observe a change in status may be difficult to

capture in admission and discharge data. (See Longabaugh and Clifford 1992; and McAuliffe in Einstein 1989 for discussion of these issues in the areas of employment and criminal involvement.) However, our research is based on information collected by MATS, and we are unable to address such issues as worker performance or changes in a worker's responsibility or job satisfaction.

Another limitation of the present approach is that it relies on aggregate data and does not control for client-level factors affecting outcome. Our ongoing research uses the client-level admission and discharge data to examine the determinants of clients' reduction in substance use, considering such variables as initial drug use frequency, sociodemographic variables such as household income and education status, and units of service.

ACKNOWLEDGMENTS

We are grateful to Marlene McMullen-Pelsor and Jereal Holley of the Maine Office of Substance Abuse who provided the information for this report. We wish to thank Kristen Spanfelner for providing valuable research assistance. Errors and omissions in the report are the responsibility of the authors alone.

NOTES

1. For a critique of privatization in the health and human services fields, see Smith and Lipsky (1992); Jencks (1994) discusses performance contracting as it relates to services for the homeless; Dorwart, Schlesinger, and Pulice (1986) discuss the case of contracting for mental health services in Massachusetts.
2. OSA included performance standards in its FY 1992 contracts, but no rewards or penalties were attached to performance ratings. OSA monitored performance and reported the results to the providers during the contract year, but the providers were "held harmless." As of July 1, 1992, the beginning of FY 1993, this hold harmless provision was removed, and providers began to be held accountable for their performance.
3. It was also intended that the contracting system reward a provider who met the performance standards within its contracted amount by allowing the provider to retain any surplus funds. To date, OSA has not rewarded good performers in this manner.
4. Since the collection of MATS data did not begin until the second quarter of FY 1990, performance cannot be measured for the first quarter of FY 1990. Outpatient service delivery performance is measurable for the first quarter as this data was collected prior to the implementation of MATS. Programs could choose to enter all existing clients onto MATS by submitting admissions forms for all clients in treatment as of October 1, 1989 or could submit data only

for those clients admitted after the introduction of MATS. Both the admission and discharge forms underwent extensive changes in April 1990 (for emergency shelter and detoxification programs changes were not made until July 1991), but some programs continued to use the old forms until their supplies ran out. Where possible, we have taken into account the absence or possible imperfections in the FY 1990 data. In spite of our efforts at making corrections, FY 1990 data may be unreliable.

5. We have been informed that administrative staff at some programs complete the MATS forms based on interviews with clients or information contained in clinical records. The MATS manual specifically states that "the counselor having the face-to-face contact with the client" complete the forms "either during the session or soon after" (Maine Office of Substance Abuse 1994: 2). We do not know how widespread the practice of using non-treatment staff to report the data is currently or has been in the past.
6. In the regression analyses reported in the following section, we include certain noncontracted programs. We do not include those programs in the analysis of trends reported here.
7. Outpatient includes both outpatient and intensive outpatient programs. Residential includes adolescent residential rehabilitation, extended care, detoxification, halfway house, emergency shelter, residential rehabilitation and extended shelter.
8. Data for the following indicators were not collected in FY 1990: reduction in problems with spouse, reduction in problems with family, reduction in problems with employer, reduction in absenteeism, and IV drug use. Data for the following indicators were not collected in FY 1990 or FY 1991 for emergency shelter and/or detoxification programs: referral in the continuum of care, referral to self-help (emergency shelter only), IV drug use, and concurrent psychological problem. We therefore modified the number of indicators required to be met during these periods. In all cases, we followed OSA's formula for FY 1993. For example, FY 1993 indicators require that outpatient programs meet 8 out of 12 effectiveness indicators; however, in FY 1990, only eight indicators were measurable. In FY 1993, OSA measured eight indicators for halfway house programs, requiring these programs to meet at least five indicators. Therefore, following this formula, we required outpatient programs in FY 1990 to meet five out of the possible eight indicators.
9. Not all clients are measured for each indicator as certain indicators contain initial criteria. For example, only clients who entered treatment employed are measured for the maintained employment indicator.
10. These programs were obliged to report to OSA because other programs within the same agency were contracting with OSA.
11. The *osashare* variable is based on OSA's annual funding to a program and therefore has the same value in all quarters in a particular fiscal year; it is always 0 for these programs.
12. We note that this variable is a "noisy" proxy for size as there is a good deal of variance in quarterly discharges from a program. In ongoing research we will analyze other proxies for size.

13. Note 11 holds true for the variable *admcost*, too, since it is calculated using annual cost data collected from data in the OSA contracts. *admcost* is not available for the noncontracted programs.
14. In general, the coefficients on our measures of program/agency characteristics were either statistically insignificant or, when significant, were very small with no pattern across indicators or categories. For example, the *urbrural* variable is positive and significant for the effectiveness score, lending some support to arguments that it is easier for urban programs to be effective. However, the coefficient for this variable is negative and significant for the special populations score, arguing against this theory. The coefficient is not significant in the efficiency regression.
15. Detailed regression results are available from the authors on request.

REFERENCES

- Aiken, L. 1986. "Retrospective Self-Reports by Clients Differ from Original Reports: Implications for the Evaluation of Drug Treatment Programs." *The International Journal of the Addictions* 21 (7): 767-88.
- Commons, M., T. G. McGuire, and M. H. Riordan. 1993. "Initiation of Performance Contracting for Substance Abuse Services in Maine." Unpublished manuscript.
- Dorwart, R., M. Schlesinger, and R. Pulice. 1986. "The Promise and Pitfalls of Purchase of Service Contracts." *Hospital and Community Psychiatry* 37 (9): 875-78.
- Einstein, S. 1989. "From Theory to Practice: The Planned Treatment of Drug Users; An Interview with Dr. William McAuliffe." *International Journal of the Addictions* 24 (6): 527-608.
- Institute of Medicine. 1990. *Treating Drug Problems*. Washington, DC: National Academy Press.
- Jencks, C. 1994. *The Homeless*. Cambridge, MA: Harvard University Press.
- Longabaugh, R., and P. R. Clifford. 1992. "Program Evaluation and Treatment Outcome." *Annual Review of Addictions Research and Treatment*, 223-47.
- Magura, S., D. Goldsmith, C. Casriel, P. J. Goldstein, and D. S. Lipton. 1987. "The Validity of Methadone Clients' Self-Reported Drug Use." *International Journal of the Addictions* 22 (8): 727-49.
- Maine Office of Substance Abuse. 1994. *Maine Addiction Treatment System Instruction Manual*. Augusta, ME.
- Maisto, S. A., J. R. McKay, and G. J. Connors. 1990. "Self-Report Issues in Substance Abuse: State of the Art and Future Directions." *Behavioral Assessment* 12 (1): 117-34.
- McLellan, A. T., and A. I. Alterman. 1991. "Patient Treatment Matching: A Conceptual and Methodological Review with Suggestions for Future Research." In *Improving Drug Abuse Treatment*, edited by R. W. Pickens, C. G. Leukefeld, and C. R. Schuster, 114-35. NIDA Research Monograph Series 106. Washington, DC: DHHS Publication No. (ADM) 91-1754.
- Smith, S. R., and M. Lipsky. 1992. "Privatization in Health and Human Services: A Critique." *Journal of Health Politics, Policy and Law* 17 (2): 233-53.